XXXVI.—*Necrophagous Diptera attracted by the Odour of Flowers.* By E. E. Austen, Zoological Department, British Museum.

The British Museum has recently received from Mr. J. H. Hart, F.L.S., Superintendent of the Botanical Department, Trinidad, W.I., a series of Diptera, accompanied by the following note:—"....you mentioned you would at any time be glad of Diptera. Herewith I send you a miscellaneous collection caught in a flower of *Aristolochia gigas*, var. *Sturtevantii*. This flower gives off an odour indistinguishable from that of carrion, so much so that it has on several occasions attracted the vultures of our island (*Cathartes aura*) and set our workmen hunting for dead fowls &c. The plant is an introduction, but we have a smaller and similar one, a native. I think it may be taken, therefore, that the flies will represent the carrion-flies of our district."

Unfortunately, owing to the fact that they were not sent pinned, but simply wrapped in an envelope of stout paper, which was inserted in a cardboard case for transmission, the specimens arrived in fragments; consequently the task of determination, never an easy one in the case of flies belonging to the present group, has been rendered vastly more difficult. However, so far as I have been able to make them out, the Diptera forwarded by Mr. Hart belong to the following species, which, it will be observed, are all of them true Muscidæ (including Anthomyinæ):—

1. *Lucilia*, sp.
2. *Lucilia*, sp. alia. } Some half-dozen specimens of each.
3. *Compsomyia macellaria*, F. Twelve specimens.
4. *Tachininæ*, gen. et sp. incert. A single specimen.
5. *Musca domestica*, L. A single female.
6. *Sarcophaga*, sp. Two males, two females.
7. *Ophyra œnescens*, Wied. One male, six females.

In the case of each of the species of *Lucilia* above referred to the wings are yellowish, with the apical third brown, while the antennæ, face, and cheeks are orange-yellow; in one of the species, however (the larger, ranging apparently from 9 to 11 millim. in length), the frontal stripe and pleuræ are also orange-yellow, while in the other and smaller species the frontal stripe, except a spot immediately above the base of the antennæ, is black, and the pleuræ are metallic green. In each species the greater portion of the first abdominal segment

is yellow or orange. The larger of the two species appears to be closely allied to, if not actually conspecific with, a specimen from Mexico (*ex Coll. Saunders*), placed in the Museum collection under *Musca*, and labelled "*femorata*, W.," in Walker's handwriting—therefore presumably a type. I have, however, failed to discover where this species was described. Moreover, the Museum collection already contains undetermined specimens of both of the Trinidad species of *Lucilia* from the Amazon, collected by Bates. I did not myself meet with either during a recent expedition to the Lower Amazon, but no doubt the species are widely distributed in the Neotropical Region.

Compsomyia macellaria, F., the most numerously represented species in the above list, is also the most interesting, since its larvæ, known as "screw-worms" in the south and west of the United States, besides attacking various domestic animals, have frequently caused death in the human subject by their ravages in the nasal fossæ and frontal sinuses *. For this reason the species was described by Coquerel † as *Lucilia hominivoraæ*, from specimens bred from larvæ the attacks of which had proved fatal to a French convict in Cayenne. According to one of Dr. Coquerel's informants similar cases are pretty common among the French convicts in Guiana, and an instance of non-fatal attack has been reported from Trinidad itself ‡. P. S. de Magalhaes, in recording the fly as having been bred from larvæ from the nasal fossæ of the human subject at Rio de Janeiro, points out § the wide distribution of the species, which ranges from the Argentine and Chili to the southern United States of North America. I myself met with it on the Amazon and the Pará River.

The solitary Tachininid sent is a mere fragment, which it

* *Cf.* Ann. & Mag. Nat. Hist. ser. 5, vol. xii. (1883) pp. 353–355.

† Ann. Soc. Ent. Fr. sér. 3, t. vi. (1858), pp. 171–176. See also Coquerel, Ann. Soc. Ent. Fr. sér. 3, t. vii. pp. 233–237: "Nouveau cas de Mort produit par la *Lucilia hominivorax*, et description de la larve de ce Diptère."

‡ *Vide* 'Trinidad Field Naturalists' Club,' vol. i. no. 3, Aug. 1892, pp. 59–61. See also a paper entitled "The Cattle Fly, *Compsomyia macellaria*," by C. W. Meaden (*ibid.* vol. ii. no. 11, Dec. 1895, pp. 279–281), dealing with the presence of the larvæ in sore places on cattle. The author states that he has never observed the fly on dead animals: this is curious, as at Mosqueiro, on the Pará River, I took it on a dead kid. From "Observations on the Insects of Jamaica," by William Jones (Journ. Institute of Jamaica, vol. i. no. 8, Dec. 1893, p. 372), it would appear that attacks by this fly on human beings are common enough in Jamaica, or, at any rate, were so in the earlier part of this century.

§ Bull. Soc. Zool. France, t. xx., 1895, p. 117.

is quite impossible to determine. Its occurrence at all in such company is difficult to understand, unless it had visited the flower as it would visit any other, since the Tachininæ are met with on flowers and leaves, and are not necrophagous; their larvæ are well known as internal parasites of caterpillars and other insects.

I am not aware that *Musca domestica*, L., has hitherto been recorded from Trinidad, though the species is known to occur in Brazil and in Porto Rico and Guadeloupe in the Antilles. I have nowhere seen it in such swarms as in a house about two miles from Pará. It is probable that this species is now cosmopolitan, having been carried by ships all over the civilized world.

The specimens of *Sarcophaga* are in so hopeless a condition that it would be futile to attempt to determine the species, which, however, belongs to the group without dorso-central bristles. The median of the three stripes on the thorax has a distinct narrow dark line on each side of it, the face and orbits are golden, the hypopygium of the male and the anus of the female orange-red, and the middle and hind tibiæ of the male are clothed on the inside with long hair.

Ophyra œnescens was described by Wiedemann (Auss. zweifl. Insekten, ii. p. 435. 29) from New Orleans and has been recorded by Macquart (Dipt. Exot. 1er Suppl. p. 203. 4) from Galveston, Texas. I may add that Schiner ('Fauna Austriaca,' Diptera, i. p. 620) mentions that he once found the European *Ophyra anthrax*, Mg., in countless numbers round a dead horse.

So far as I have been able to discover, no instance of necrophagous Diptera being attracted by malodorous flowers has as yet been recorded from the New World. The late Mr. C. V. Riley found the larva of a *Sarcophaga* feeding on the putrid insect-remains in the pitchers of two species of insectivorous plants—the spotted trumpet-leaf (*Sarracenia variolaris*, Michx.) and the yellow trumpet-leaf (*S. flava*, L.). Riley described the fly as *Sarcophaga sarracenie*, but afterwards thought that it might be only a variety of the common European *S. carnaria*, L.* Here, however, the dead insects and not the flower itself had formed the attraction. But in the Old World several cases similar to the present have been described. M. Schnetzler, writing "On the part played by

* Riley, Trans. St. Louis Acad. of Nat. Sci. iii. p. 239; 'Science Gossip,' 1874, pp. 274–275, fig. 182; Canad. Ent. vi. pp. 209–214, fig. 26; Seventh Ann. Rep. Ins. State of Missouri, 1875, p. 181.

Insects during the Flowering of *Arum crinitum*, Ait." *, states that the spathe of this flower "diffuses so strong an odour of putrid flesh that the insects which deposit their eggs upon decomposing animal matters are attracted by it." *Lucilia cæsar*, L., visits the flower in numbers and oviposits among the viscous hairs lining the interior of the spathe. All the flies found by M. Schnetzler at the bottom of the spathe were dead, and the author gives reasons for considering that the insects may furnish nitrogenous nutriment to the plant through the medium of fluid contained in certain hairs which clothe a great part of the inner surface of the spathe. Other flies, however, less pressed to oviposit may not penetrate further than the stamens, and may thence convey the pollen to the stigmas or fly away to lay their eggs in the spathe of another plant, on the stigmas of which they deposit the pollen which they have carried away from the stamens of the former one. Doubtless the Trinidad flies perform a similar office for *Aristolochia*.

Dr. Ch. Coquerel, in discussing the reason why *Compsomyia macellaria*, Fabr., sometimes attacks man, mentions that the blow-fly (*Calliphora vomitoria*, L.) † oviposits on *Arum dracunculus*, L. (= *Dracunculus vulgaris*, Schott), being deceived by the corpse-like odour of the plant ‡.

Mr. H. O. Forbes, in recording the discovery of "a fine new species of that curious family the Rafflesiaceæ," which he found growing on the side of the volcano called Dempo, in Sumatra, writes:—"It smelt powerfully of putrid flesh, and was infested with a crowd of flies, which followed me all the way as I carried it home" §.

Lastly, I am informed by Lieut.-Col. C. T. Bingham that *Amorphophallus campanulatus*, Roxb., an arum which has been introduced into S. Tenasserim by the Malays and is now very common in that district, gives off a most overpowering and fetid odour of carrion from its livid purple spadix, and is most attractive to flies.

* Ann. & Mag. Nat. Hist. ser. 5, vol. iv. pp. 399–400 ('Comptes Rendus,' Sept. 8, 1879, p. 508).

† ? *C. erythrocephala*, Mg.

‡ Coquerel, Ann. Soc. Ent. Fr. sér. 3, t. vi. (1858) p. 176.

§ Henry O. Forbes, 'A Naturalist's Wanderings in the Eastern Archipelago' (1885), p. 206.